

# Comparison of quality of life between myopic patients with spectacles and contact lenses, and patients who have undergone refractive surgery

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## Abstract

**Purpose:** The present study aims at investigating and comparing the vision-related quality of life of myopic persons who wear spectacles or contact lenses with those who have undergone refractive surgery. It also compares the vision-related quality of life of these two groups with that of emmetropes.

**Method:** In this study, the questionnaire of evaluation instrument of refractive error in quality of life (NEI/RQL-42) was used to compare the quality of life between 154 myopic patients with spectacles and contact lenses, and 32 patients who have undergone refractive surgery. The two groups were also compared with 54 emmetropes. The questionnaire included 13 different subgroups (score 0–100) related to vision. Data was analyzed using SPSS software.

**Results:** The overall score of quality of life in emmetropes ( $95.11 \pm 4.23$ ) was more than that in persons who had undergone refractive surgery ( $86.98 \pm 4.73$ ), and it was the least in the group wearing spectacles or contact lenses ( $78.30 \pm 9.21$ ), ( $P < 0/001$ ). Furthermore, except for a glare variable, the studied groups indicated a statistically significant difference in all the thirteen subgroups of vision-related quality of life.

**Conclusion:** Quality of life for people with myopia who had the refractive surgery was better than people with myopia who wore spectacles or contact lenses. Although quality of life in people with myopia who had the refractive surgery was less than emmetropia, it seems that refractive surgery improves quality of life of myopic patients.

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**Keywords:** Quality of life; Myopia; Ametropia

## Introduction

The sense of sight in humans is usually taken as the most important factor for comprehending and receiving information from the environment and, in turn, plays an important role in regulating most human activities and behaviors. Accordingly, any damage to this sense might considerably affect a person's adaptation with the environment.<sup>1</sup>

Refractive error, after cataract, is the second reason for blindness among different age groups, and it can also cause visual impairment. Additionally, previously conducted studies

have revealed that children and adults who suffer from refractive error in the world often do not use the best method of vision correction.<sup>2</sup> Uncorrected refractive error can lead to problems in a person's quality of life related to vision and makes it difficult for them to do tasks pertinent to it.<sup>3</sup> While spectacles and contact lenses are usually the first selection of correcting the refractive error for myopic persons, in the last decade, refractive surgery has found its own advocates, even among persons who have worn contact lenses. It is now the most common optional surgery in the world.<sup>4</sup>

The prevalence of myopia, especially among Asians, is increasing. It is estimated to be 70–90% in some Asian countries,<sup>5</sup> 50% in England,<sup>4</sup> and 25% in North America.<sup>6</sup> In addition to nationality, sex and race affect the chance and prevalence of myopia in women, which is higher than men, and in whites, which is higher than blacks.<sup>7</sup> The prevalence of myopia in Tehran, Iran is estimated to be 21/8%.<sup>6</sup>

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Myopia has a set of social, economic, and educational consequences, and its economic impact is considerable in the world.<sup>8</sup> Moreover, in Singapore, the average annual direct cost of myopia for each twelve-to seventeen-year-old student was estimated to be 148 U.S. dollars.<sup>9</sup>

Refractive error surgery decreases myopic subjects' dependence on spectacles or contact lenses.<sup>10</sup> Popularity and success of these surgeries are related to ease of doing, favorable results of uncorrected vision, and few side effects of these surgeries. They generally entail three Photorefractive keratectomy methods: LASIK (Laser in situ keratomileusis), LASEK (Laser sub epithelial keratomileusis), and PRK (-Photo Refractive Keratectomy).

Recently, due to more attention that has been given to patient health, it has been understood that results of old methods such as clinical and lab evaluations need to be completed with measurements that deal with patient concerns and problems.<sup>11</sup> In a similar vein, since medical interferences recently play a significant role in patient quality of life, using evaluation tools of patient-based consequences is a suitable and practical way to uncover patient problems and concerns.<sup>12</sup>

The result of refractive surgery has usually been determined by scientific standard clinical measurements such as uncorrected visual acuity after surgery and remaining refractive error.<sup>13</sup> Although these measurements provide important information, they cannot necessarily evaluate the visual improvement and individual comprehension of patients.<sup>14</sup> Thus, in addition to evaluation of refractive surgery results by scientific standard clinical measurements, a person's quality of life should also be taken into consideration. The importance of patient-based measurements for measuring their quality of life has nowadays been recognized, and accordingly, numerous quality of life questionnaires have been developed. Consequently, evaluating the quality of life related to refractive error and vision performance based on patient views has increased in recent decades.<sup>15</sup> In recent decades, especially after the 1990s, the quality of life has been introduced as one of the most important indices to evaluate health, welfare, social, and rehabilitation programs.<sup>16</sup> Hence, measuring the quality of life might be a great help to us to reach a correct comprehension of needs, decisions, and planning for myopic subjects.<sup>17</sup> In fact, the quality of life factor can show that extent health technical measures and inter-section cooperation have been effective in treating and elevating the personal and social level of a person's life.<sup>18</sup>

The purpose of the current study is to make a comparison between the quality of life of myopic subjects who have undergone refractive surgery and those wearing spectacles or contact lenses and also to compare the quality of life of these two groups with that of emmetropes.

## Method

The present study was conducted on students of Iran University of Medical Sciences and Health Services with the age range of 18–30 years old. Students were asked to complete

the National Eye Institute/Refractive Error Quality of Life Instrument-42 questionnaire.

In this research study, 240 persons were studied, 154 of whom were myopic subjects who wore spectacles or contact lenses, 32 of whom had undergone refractive surgery, and 54 of whom were emmetropes. The spherical equivalent refractive error between  $-0.75$  and  $+0.75$  diopter, was considered as emmetropia, and the spherical equivalent refractive error higher than  $-0.75$  diopter was considered as myopia. Those who had an eye disease or hyperopia were omitted from the study.

Participation in the study was voluntary, and the participants were ensured as to their anonymity and confidentiality of recorded data. They were also justified with regard to the purpose and its conduct method.

The process of gathering intended data was done in single phase and through the three methods of observation, interview, and questionnaire. At first, some questions were asked about age, use of spectacles or contact lenses, refractive surgery experience, and any eye-related disease experience. Then some explanations were given to the persons about how to fill out the questionnaire. After that, by observing the person's spectacles, its number was estimated and recorded.

The questionnaire of evaluation of quality of life related to refractive error (NEI/RQL-42) was developed to evaluate the vision-related quality of life and consists of 42 items in 13 main subgroups. These 13 subgroups are: clarity of vision, expectations, near vision, far vision, diurnal fluctuations, activity limitations, glare, symptoms, dependence on correction, worry, suboptimal correction, appearance, and satisfaction with correction.

Each question includes some choices with a score of 0–100 in the sense that 0 represents the worst possible status and 100 represents the best possible status. To calculate subscale scores, every item in each subscale was averaged together.

This questionnaire is a standard questionnaire translated by Amir Pakpour et al, in Iran.<sup>19</sup> According to this study, the NEI/RQL-42 questionnaire is a valid and reliable instrument to evaluate the vision-related quality of life among Iranian people. Its reliability and validity were calculated by Cronbach's alpha and turned out to be between 0/70 and 0/92, and its intra-class correlation was also between 0/70 and 0/89.<sup>19</sup>

Finally, the obtained data from the questionnaire was gathered, and the means of each group were compared by using one-way ANOVA and Tukey's post-hoc test. Furthermore, the significance level was taken to be at 0/05. Statistical analyses were performed by SPSS version 20.

## Results

240 persons with an age mean of  $25/79 \pm 2/56$  (18–30 years old age range) were selected as participants. From them, 154 myopic persons wore spectacles or contact lenses, 32 had undergone refractive surgery, and 54 were emmetropes. Furthermore, 46.7% were female, and 53.3% were male. In the female group, 63.4% wore spectacles or contact lenses, 17.9% had undergone refractive surgery, and 18.8% were

emmetropes. In the male group, 64.9% wore spectacles or contact lenses, 9.4% had undergone refractive surgery, and 25.8% were emmetropes. Table 1 represents the basic information of the participants. Based on the study results, a higher percentage of women had undergone refractive surgery.

The overall score mean of quality of life in persons who wore spectacles or contact lenses, those who had undergone refractive surgery, and the emmetropes were  $78.30 \pm 9.21$ ,  $86.98 \pm 4.73$ ,  $95.11 \pm 4.23$ , respectively. The same figures are shown in Table 2.

According to the results of Kolmogorov–Smirnov test, the vision-related quality of life has a normal distribution ( $P = 0/174$ ), and all of its subgroups have a non-normal distribution ( $P \leq 0/001$ ). Therefore, one-way ANOVA and also Tukey post-hoc tests were used to compare the quality of life among the three studied groups. Based on results of these tests, there was a significant difference between the groups ( $P < 0.001$ ). In addition, Kruskal–Wallis test was also employed to compare the mean difference of quality of life subgroups. According to results of Tukey's test, there was a significant difference between each of the subgroups ( $P \leq 0/001$ ). Table 3 presents the results of Kruskal–Wallis test.

The overall score of quality of life in emmetropes was more than that of in persons who had undergone refractive surgery, and it was the least in persons wearing spectacles or contact lenses ( $P < 0/001$ ). The study also revealed a significant difference between all subgroups of quality of life including clarity of vision ( $P < 0/001$ ), expectations ( $P < 0/001$ ), near vision ( $P = 0/002$ ), far vision ( $P = 0/005$ ), diurnal fluctuations ( $P = 0/008$ ), activity limitations ( $P < 0/001$ ), symptoms ( $P = 0/007$ ), dependence on correction ( $P < 0/001$ ), worry ( $P < 0/001$ ), appearance ( $P < 0/001$ ), satisfaction with correction ( $P < 0/001$ ), and suboptimal correction ( $P < 0/001$ ), except for the glare subgroup ( $P = 0/829$ ) (Table 3). In addition, in the studying of all subgroups between the three main groups by use of Tukey's post-hoc test, there was a significant difference between all subgroups except for near vision ( $P = 0.18$ ) and glare ( $P = 0.925$ ).

## Discussion

The present study tried to make a comparison between the vision-related quality of life of myopic subjects who wear spectacles or contact lenses and that of those who have undergone refractive surgery and also to compare the quality of life of these two groups with that of emmetropes. Although

Table 2

Comparing the overall score mean of quality of life in the studied groups.

Group	Mean $\pm$ Std. deviation	P value
Spectacles & contact lens	$78.30 \pm 9.21$	$P < 0/001$
Refractive surgery	$86.98 \pm 4.73$	
Emmetropia	$95.11 \pm 4.23$	

some similar studies have been conducted in different countries, doing the same study in Iran is necessary mainly due to the fact that various social, cultural, and environmental factors can affect the quality of life.

The results of this research study uncovered that the vision-related quality of life of myopic subjects who had undergone refractive surgery was better than that of those who wore spectacles or contact lenses ( $P \leq 0.001$ ). The results of other pertinent previously carried out studies also show that persons who had undergone refractive surgery have a better quality of life and also more favorable mental and social performances.<sup>4,18,20–22</sup> This study also indicated that emmetropes have better quality of life than persons who had undergone refractive surgery ( $P \leq 0.001$ ), and this might be because of the side effects of the surgery that can affect their quality of life.

Regarding sex, in the female group, 63.4% wore spectacles or contact lenses, and 17.9% had undergone refractive surgery. In addition, in the male group, 69.4% wore spectacles or contact lenses, and 9.4% had undergone refractive surgery. As it is noticed, the percentage of women in the refractive surgery is more than that of males, which is in accordance with the related literature.<sup>4,18,21</sup> This difference of percentage between women and men might be because of the cosmetic effect of refractive surgery and lack of need of myopic subjects to wear spectacles after the surgery, which has caused women to be more interested in this type of surgery.

In the present study, the quality of life was investigated in 13 vision-related subgroups, and it was understood that all the subgroups, except for the glare ( $P = 0.829$ ) had a significant difference with quality of life.

Since the clarity of vision degree is related to the myopia strength, as the clarity of vision decreases, the quality of life also decreases ( $P \leq 0/001$ ). This result is in line with that of previously conducted studies.<sup>18,20,22</sup>

The expectation level that a person has from clarity of vision effect on his/her life is inversely related to his/her quality of life, meaning that as the expectations decrease, the

Table 1

The basic information of participants in terms of sex.

	Spectacles & contact lens <sup>a</sup>	Refractive surgery <sup>a</sup>	Emmetropia <sup>a</sup>	Total	P value
Female	63/4	17/9	18/8	100	$P = 0.362$
Male	64/9	9/4	25/8	100	
Age (Mean $\pm$ Std.Deviation)	$25.28 \pm 2.56$	$26.06 \pm 2.01$	$26.03 \pm 2.47$	$25.79 \pm 2.56$	$P = 0.603$
Female	25/61	25/66			$P = 0.322$
Male	25/94	25/47			

<sup>a</sup>Frequency in percent.

Table 3  
Results of Kruskal–Wallis test on comparing different aspects of quality of life in the studied groups.

	Clarity of vision	Expectation	Near vision	Far vision	Diurnal fluctuations	Activity limitations	Symptoms	Dependence on correction	Worry	Appearance	Satisfaction with correction	Suboptimal correction	Glare
Chi-Square	18.84	152.12	14.75	13.05	11.84	83.59	12.24	174.85	16.22	150.05	40.49	172.81	0.88
Mean $\pm$ SD	96.91 $\pm$ 4.68	100 $\pm$ 0	99.42 $\pm$ 3.03	94.53 $\pm$ 6.84	95.98 $\pm$ 12.03	90.23 $\pm$ 17.59	100 $\pm$ 0	71.99 $\pm$ 24.03	100 $\pm$ 0	97.77 $\pm$ 6.34	100 $\pm$ 0	84.49 $\pm$ 18.48	99.87 $\pm$ 0.86
Ref surg	94.27 $\pm$ 9.84	5.46 $\pm$ 15.20	95.50 $\pm$ 6.59	91.77 $\pm$ 8.08	92.44 $\pm$ 13.97	83.03 $\pm$ 10.01	99.21 $\pm$ 4.41	50.78 $\pm$ 24.78	100 $\pm$ 0	90.62 $\pm$ 9.81	100 $\pm$ 0	83.2 $\pm$ 14.75	99.41 $\pm$ 3.31
Sp & CL	90.58 $\pm$ 10.93	40.58 $\pm$ 26.53	97.06 $\pm$ 7.41	88.63 $\pm$ 11.25	89.01 $\pm$ 17.09	84.13 $\pm$ 11.64	47.61 $\pm$ 17.68	66.36 $\pm$ 25.17	47.35 $\pm$ 36.44	84.35 $\pm$ 17.41	96.26 $\pm$ 8.70	83.92 $\pm$ 17.19	84.21 $\pm$ 17.99
P Value	P < 0.001	P < 0.001	P = 0.002	P = 0.005	P = 0.008	P < 0.001	P = 0.007	P < 0.001	P = 0.001	P < 0.001	P < 0.001	P < 0.001	P = 0.829

vision-related quality of life increases. Furthermore, concerns about doing duties, problems on the life needs, getting involved in daily activities, and also activity limitations might be ascribed to the effect of clear vision on satisfaction feeling and improvement of vision-related quality of life. Moreover, the persons who wear spectacles and contact lenses, compared with emmetropes and those who had undergone refractive surgery, showed some concerns about their appearance, dependence on correction, satisfaction with correction, and also suboptimal correction that these concerns indicate the superiority of refractive surgery to the spectacles and contact lens correction methods.

The current study is in line with related studies which have been done in the UK,<sup>4,22</sup> Portugal,<sup>20</sup> and Australia.<sup>21</sup>

Lack of clinical examination and doing only interview, observation, and questionnaire methods are among the current study limitations. Hence, to prove whether people had really had undergone refractive surgery or not and to eliminate people who had eye disease, the only methods used were interview and questionnaire. In this study, the strength of myopia was estimated by observing the spectacles without any clinical examination; therefore, the exact amount of refractive error was not specified. Thus, it is suggested to carry out a similar research study by using clinical examinations.

### Conclusion

The quality of life of the myopic subjects who had undergone the refractive surgery is better than those who had worn spectacles or contact lenses. Although the quality of life of the person who had undergone refractive surgery was lower than that of emmetropes, refractive surgery leads to an improvement in the quality of life of myopic subjects.

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